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EXAMINER

BAREFORD, KATHERINE A

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 10/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/709,138

Applicant(s)

MURAYAMA, KEI

Examiner

Katherine A. Bareford

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,7 and 9-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

*claims 2,5,6 and 8 are canceled*

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 25, 2006 has been entered.

The amendment filed with the RCE submission of September 25, 2006 has been received and entered. With the amendment, claims 2, 5, 6 and 8 are canceled, and claims 1, 3, 4, 7 and 9-12 (including new claim 12) are pending for examination.

### ***Interview***

2. The Examiner notes that the file contains a draft amendment filed July 24, 2006 that refers to an interview to be held July 26, 2006. However, the file does not contain information that this interview was held, and the amendment of September 25, 2006 contains no reference to this interview. If the interview was actually held, applicant is requested to send in a summary.

### ***Claim Objections***

3. Claim 12 is objected to because of the following informalities: in claim 2, line 2, "small" should be "smaller" for correct grammar.

Appropriate correction is required.

*Claim Rejections - 35 USC § 112*

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1, 3, 4, 7 and 9-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, lines 11-13, "the oxidizing agent is formed selectively in portions, which are smaller than a predetermined dimension, out of the space portion between the electrodes of the conductive pattern" is confusing as worded. It appears that applicant means that the oxidizing agent is "coated" selectively in portions, not "formed" to correspond to the coating step of the oxidizing agent. If it was "formed" it would appear that it could be made at that portion. Furthermore, ~~as to~~ the "portions, which are smaller than a predetermined dimension" are confusing as what how the "predetermined dimension" is measured as compared to the space portion dimensions. As worded, the "predetermined dimension" can be any size, including larger than any

of the space portion dimension, and the portions can thus all be coated with the oxidizing agent.

Claim 3, line 2, "forming selectively" should be "coating selectively" to correspond to the wording of claim 1 for correct antecedent basis.

Claim 11, last three lines, "the protection film is formed selectively in portions, which are smaller than a predetermined dimension, out of the space portion between the electrodes of the conductive pattern" is confusing as worded. The "portions, which are smaller than a predetermined dimension" are confusing as what how the "predetermined dimension" is measured as compared to the space portion dimensions. As worded, the "predetermined dimension" can be any size, including larger than any of the space portion dimension, and the portions can thus all be filled with the protection film.

Claim 12, line 2, "formed selectively" should be "coated selectively" to correspond to the wording of claim 1 for correct antecedent basis.

The other dependent claims do not cure the defects of the claims from which they depend.

*Claim Rejections - 35 USC § 102*

6. The rejection of claims 2, 6 and 8 <sup>under</sup> 35 U.S.C. 102(b) as being anticipated by Miller (US 4668533) is withdrawn due to the cancellation of claims 2, 6 and 8 in the amendment of September 25, 2006.

*Claim Rejections - 35 USC § 103*

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 3, 4, 7, 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al (US 5167992) in view of the admitted state of the prior art, EP 837 623 (hereinafter '623) and Miller (US 4668533).

Lin teaches a method of electroless plating. Column 1, lines 5-10. A substrate is prepared that has an insulating body and a conductive pattern formed on the insulating body. Column 3, lines 45-55 and column 4, lines 30-50. The substrate is to be used for microelectronic interconnect substrates or circuit boards. Column 3, lines 45-55. A catalytic metal serving as a catalyst of an electroless plating process is adhered onto the insulating body and the conductive pattern. Column 5, lines 35-60. An oxidizing agent, which can oxidize the catalytic metal and make the catalytic metal in an inactive state to the electroless plating is applied to the catalytic metal. Column 5, line 60 through column 6, line 20 and column 7, lines 25-35. It would be applied in a space portion S between the conductive pattern features (as it is shown being applied to the entire

surface). Column 5, line 60 through column 6, line 20. Then a metal layer is selectively formed on the conductive pattern by electroless plating. Column 6, lines 20-30.

Claim 4: the adhering of the catalytic metal onto the insulating body and the conductive pattern includes coating an activating solution containing ions of the catalytic metal to deposit the catalytic metal by an oxidation reduction reaction. Column 5, lines 50-60 and column 7, lines 20-25.

Claim 7: the catalytic metal is palladium. Column 5, lines 45-60. The metal formed by electroless plating can be a nickel layer. Column 6, lines 20-40.

Claim 10: the oxidizing agent can be sulfuric acid ( $H_2SO_4$ ). Column 7, lines 20-30.

Lin teaches all the features of these claims except that (1) the conductive pattern includes electrodes, (2) the dimensions of spaces between the electrodes ~~of~~ has a plurality of different dimensions, (3) that the oxidizing agent is coated selectively so that the oxidizing agent is formed selectively in portions, which are smaller than a predetermined dimension, out of the space portion between the electrodes, (4) the ink jet application of the oxidizing agent, (5) the space portion of less than 30 microns (claim 12).

The admitted state of the prior art teaches that when forming wiring substrates with conductive patterns, it is well known for the wiring patterns to include electrodes formed of copper<sup>ex</sup> which then are overplated to enhance reliability. See paragraphs [0002] – [0008] of the specification. It is also well known for the pitch of the copper electrodes on the wiring substrate to be narrowed to 60 microns or less. See paragraph

[0004] of the specification. It is also well known for the space portions between the copper electrodes to vary over the substrate. See paragraph [0006] of the specification. It is also well known to desire to form a nickel layer selectively on the copper electrodes by electroless plating. See paragraphs [0002] – [0008] of the specification.

'623 teaches that it is well known to overplate by electroless plating selectively over conductive patterns on a insulating substrate when making printed circuit boards, for example. Column 1, lines 1-10 and column 4, lines 35-45. The overcoating can be nickel based resistors. Column 7, lines 1-15. '623 provides providing a conductive circuit pattern on the insulating substrate. Column 4, lines 35-55. Then the surfaces of the conductive pattern and the substrate are activated. Column 4, lines 50-55 and column 6, lines 30-45. Then '623 provides applying a plating mask onto the activated substrate so that the areas to be plated are defined in a negative manner, where the plating mask covers all or substantially all of the surfaces except for the resistor areas to be plated. Column 6, lines 45-55. The area to be plated can be partially over the conductive pattern and partially over the insulating substrate. Column 6, lines 50-56. Then, electroless plating occurs, with plating occurring only on the areas not covered by the mask. Column 7, lines 1-15. The exact size of the resistor area to be plated can vary. Column 7, lines 20-30.

Miller teaches ink jet printing as a method to apply materials for electroless plating in a selective form, such as the sensitizers and activators. Column 2, lines 40-50,



column 3, lines 45-60 and column 4, lines 15-30. The substrate can be an active integrated circuit. Column 3, lines 25-35.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to (1), (2) and (5) modify Lin to provide that the conductive pattern includes electrodes spaced different distances apart and that these electrodes can be less than 60 microns apart as suggested by the admitted state of the prior art in order to provide a desirable circuit and microelectronic pattern because Lin teaches forming conductive patterns on insulating substrates for circuit and microelectronic usage, and the admitted state of the prior art teaches that conductive patterns on wiring substrates for such purposes conventionally have copper electrodes spaced different distances apart and that the electrodes can be less than 60 microns apart. It further would have been obvious to perform routine experimentation to optimize the distance apart to less than 30 microns apart as the admitted state of the prior art provides that less than 60 microns apart is conventional. (3) (4) It further would have been obvious to modify Lin in view of the admitted state of the prior art to apply the oxidizing agent selectively to the non electrode portions (so that not all of the non-electrode portions are contacted with oxidizing agent) by a method such as ink jet printing as suggested by '623 and Miller in order to provide a further desirable selective overplating, as Lin in view of the admitted state of the prior art teaches to apply oxidizing agent to an entire surface so that non-conductive surfaces are not coated and '623 teaches that when overplating, there are times when it is desired to have coating over some of the non-conductive areas

as well, and Miller provides a desirable method for selectively applying materials for electroless plating to particular parts of the substrate is by ink jet printing. As this method would apply oxidizing agent to some parts of the non-conductive surface and not apply oxidizing agent to other parts, oxidizing agent would be formed selectively in portions, which are smaller than a predetermined dimension, out of the space portion between the electrodes as claimed.

9. Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 837 623 (hereinafter '623) in view of the admitted state of the prior art.

'623 teaches that it is well known to overplate by electroless plating selectively over conductive patterns on a insulating substrate when making printed circuit boards, for example. Column 1, lines 1-10 and column 4, lines 35-45. The overcoating can be nickel based resistors. Column 7, lines 1-15. '623 provides providing a conductive circuit pattern on the insulating substrate. Column 4, lines 35-55. Then the surfaces of the conductive pattern and the substrate are activated by applying a catalytic metal serving as a catalyst for electroless plating. Column 4, lines 50-55 and column 6, lines 30-45. Then '623 provides applying a plating mask (protection film) onto the activated substrate so that the areas to be plated are defined in a negative manner, where the plating mask covers all or substantially all of the surfaces except for the resistor areas to be plated. Column 6, lines 45-55. The area to be plated can be partially over the conductive pattern and partially over the insulating substrate. Column 6, lines 50-56.

Then, electroless plating occurs, with plating occurring only on the areas not covered by the mask. Column 7, lines 1-15. The exact size of the resistor area to be plated can vary. Column 7, lines 20-30.

Claim 9: the plating mask can be any typical plating mask known in the art. Column 6, lines 55-60.

It is the Examiner's position that resist films are well known in the art of electroless plating as plating masks. If applicant disagrees, he should so state on the record in response.

✓ '623 teaches all the features of these claims except that (1) the conductive pattern includes electrodes, (2) the dimensions of spaces between the electrodes ~~is~~ has a plurality of different dimensions, (3) that the protection film is coated selectively so that the protection film is formed selectively in portions, which are smaller than a predetermined dimension, out of the space portion between the electrodes, (4) the protection film material (claim 12).

✓ The admitted state of the prior art teaches that when forming wiring substrates with conductive patterns, it is well known for the wiring patterns to include electrodes formed of copper<sup>er</sup> which then are overplated to enhance reliability. See paragraphs [0002] – [0008] of the specification. It is also well known for the pitch of the copper electrodes on the wiring substrate to be narrowed to 60 microns or less. See paragraph [0004] of the specification. It is also well known for the space portions between the copper electrodes to vary over the substrate. See paragraph [0006] of the specification.

It is also well known to desire to form a nickel layer selectively on the copper electrodes by electroless plating. See paragraphs [0002] – [0008] of the specification.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to (1) (2) modify '623 to provide that the conductive pattern includes electrodes spaced different distances apart as suggested by the admitted state of the prior art in order to provide a desirable circuit pattern because '623 teaches forming conductive patterns on insulating substrates for circuit usage, and the admitted state of the prior art teaches that conductive patterns on wiring substrates for such purposes conventionally have copper electrodes spaced different distances apart. (3) It further would have been obvious to modify '623 in view of the admitted state of the prior art to apply the protection film selectively to the non electrode portions (so that not all of the non-electrode portions are contacted with film) in order to provide a further desirable selective overplating, as '623 teaches that when overplating, there are times when it is desired to have coating over some of the non-conductive areas as well. As this method would apply the protection film to some parts of the non-conductive surface and not apply protection film to other parts, protection film would be formed selectively in portions, which are smaller than a predetermined dimension, out of the space portion between the electrodes as claimed. (4) it would further have been obvious to modify '623 in view of the admitted state of the prior art to use a resist film as the protection film material with an expectation of desirable coating results, because '623

teaches to use any typical plating mask known in the art, and it is the Examiner's position that a resist film is well known in the art as a plating mask.

### *Response to Arguments*

10. Applicant's arguments with respect to claims 1, 3, 4, 7 and 9-12 have been considered but are moot in view of the new ground(s) of rejection.


### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
KATHERINE BAREFORD  
PRIMARY EXAMINER